



A D T

FCC TEST REPORT

(WLAN 15.247)

REPORT NO.: RF130809E03D

MODEL NO.: WUS-N24V2

FCC ID: RRK-WUSN24V2

RECEIVED: July 30, 2014

TESTED: Aug. 05 to 12, 2014

ISSUED: Aug. 19, 2014

APPLICANT: Alpha Networks Inc.

ADDRESS: No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

LAB ADDRESS : No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

TEST LOCATION (2): No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



Table of Contents

RELEASE CONTROL RECORD	4
1. CERTIFICATION	5
2. SUMMARY OF TEST RESULTS	6
2.1 MEASUREMENT UNCERTAINTY	7
3. GENERAL INFORMATION	8
3.1 GENERAL DESCRIPTION OF EUT (WLAN)	8
3.2 DESCRIPTION OF TEST MODES	9
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	10
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	12
3.4 DUTY CYCLE OF TEST SIGNAL	13
3.5 DESCRIPTION OF SUPPORT UNITS	14
3.6 CONFIGURATION OF SYSTEM UNDER TEST	15
4. TEST TYPES AND RESULTS	16
4.1 CONDUCTED EMISSION MEASUREMENT	16
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	16
4.1.2 TEST INSTRUMENTS	16
4.1.3 TEST PROCEDURES	17
4.1.4 DEVIATION FROM TEST STANDARD	17
4.1.5 TEST SETUP	17
4.1.6 EUT OPERATING CONDITIONS	18
4.1.7 TEST RESULTS	19
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT	21
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	21
4.2.2 TEST INSTRUMENTS	22
4.2.3 TEST PROCEDURES	23
4.2.4 DEVIATION FROM TEST STANDARD	23
4.2.5 TEST SETUP	24
4.2.6 EUT OPERATING CONDITIONS	24
4.2.7 TEST RESULTS	25
4.3 6DB BANDWIDTH MEASUREMENT	38
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT	38
4.3.2 TEST INSTRUMENTS	38
4.3.3 TEST PROCEDURE	38
4.3.4 DEVIATION FROM TEST STANDARD	38
4.3.5 TEST SETUP	38
4.3.6 EUT OPERATING CONDITIONS	38
4.3.7 TEST RESULTS	39
4.4 CONDUCTED OUTPUT POWER MEASUREMENT	41
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	41
4.4.2 TEST INSTRUMENTS	41
4.4.3 TEST PROCEDURES	41
4.4.4 DEVIATION FROM TEST STANDARD	42
4.4.5 TEST SETUP	42
4.4.6 EUT OPERATING CONDITIONS	42
4.4.7 TEST RESULTS	43
4.5 POWER SPECTRAL DENSITY MEASUREMENT	45
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	45
4.5.2 TEST INSTRUMENTS	45
4.5.3 TEST PROCEDURE	45
4.5.4 DEVIATION FROM TEST STANDARD	45
4.5.5 TEST SETUP	45



A D T

4.5.6	EUT OPERATING CONDITION	45
4.5.7	TEST RESULTS	46
4.6	CONDUCTED OUT-BAND EMISSION MEASUREMENT.....	49
4.6.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	49
4.6.2	TEST INSTRUMENTS	49
4.6.3	TEST PROCEDURE	49
4.6.4	DEVIATION FROM TEST STANDARD	50
4.6.5	TEST SETUP	50
4.6.6	EUT OPERATING CONDITION	50
4.6.7	TEST RESULTS	50
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	57
6.	INFORMATION ON THE TESTING LABORATORIES	58
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	59



A D T

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130809E03D	Original release	Aug. 19, 2014



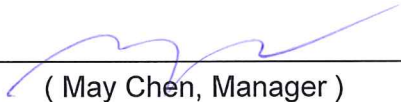
A D T

1. CERTIFICATION

PRODUCT: wifi module
BRAND NAME: Alpha
MODEL NO.: WUS-N24V2
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: Alpha Networks Inc.
TESTED: Aug. 05 to 12, 2014
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: WUS-N24V2) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , **DATE:** Aug. 19, 2014
(Claire Kuan, Specialist)

APPROVED BY :  , **DATE:** Aug. 19, 2014
(May Chen, Manager)



A D T

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -15.29dB at 2.72266MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 4874.00MHz & 4924.00MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT (WLAN)

PRODUCT	wifi module
MODEL NO.	WUS-N24V2
POWER SUPPLY	DC 3.3V from host equipment
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	802.11b: 51.286mW 802.11g: 195.434mW 802.11n (HT20): 368.204mW 802.11n (HT40): 307.474mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

Note:

- The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit	Brand	Model	Antenna Type	Net Gain (dBi) (Include cable loss)	Connector Type	Frequency range (MHz to MHz)
Chain (0)	NA	NA	PIFA	2.79	NA	2400 ~ 2500
Chain (1)	NA	NA	PIFA	2.18	NA	2400 ~ 2500

For 802.11bg mode will fix transmission on Chain (0).

- The EUT incorporates a MIMO function without beam forming.

Modulation Mode	Data Rate (MCS)	Tx & Rx configuration	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	2TX (CDD)	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX (CDD)	2RX
	MCS 8~15	2TX	2RX

3. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	OB	
-	√	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission

RE < 1G: Radiated Emission below 1GHz

RE ≥ 1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

OB: Conducted Out-Band Emission Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane** (for below 1GHz) and **Y-plane** (for above 1GHz).

POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATI ON TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

RADIATED EMISSION TEST (BELOW 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	25deg. C, 72%RH	120Vac, 60Hz	Jason Huang
RE≥1G	23deg. C, 69%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng
OB	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r02

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

3.4 DUTY CYCLE OF TEST SIGNAL

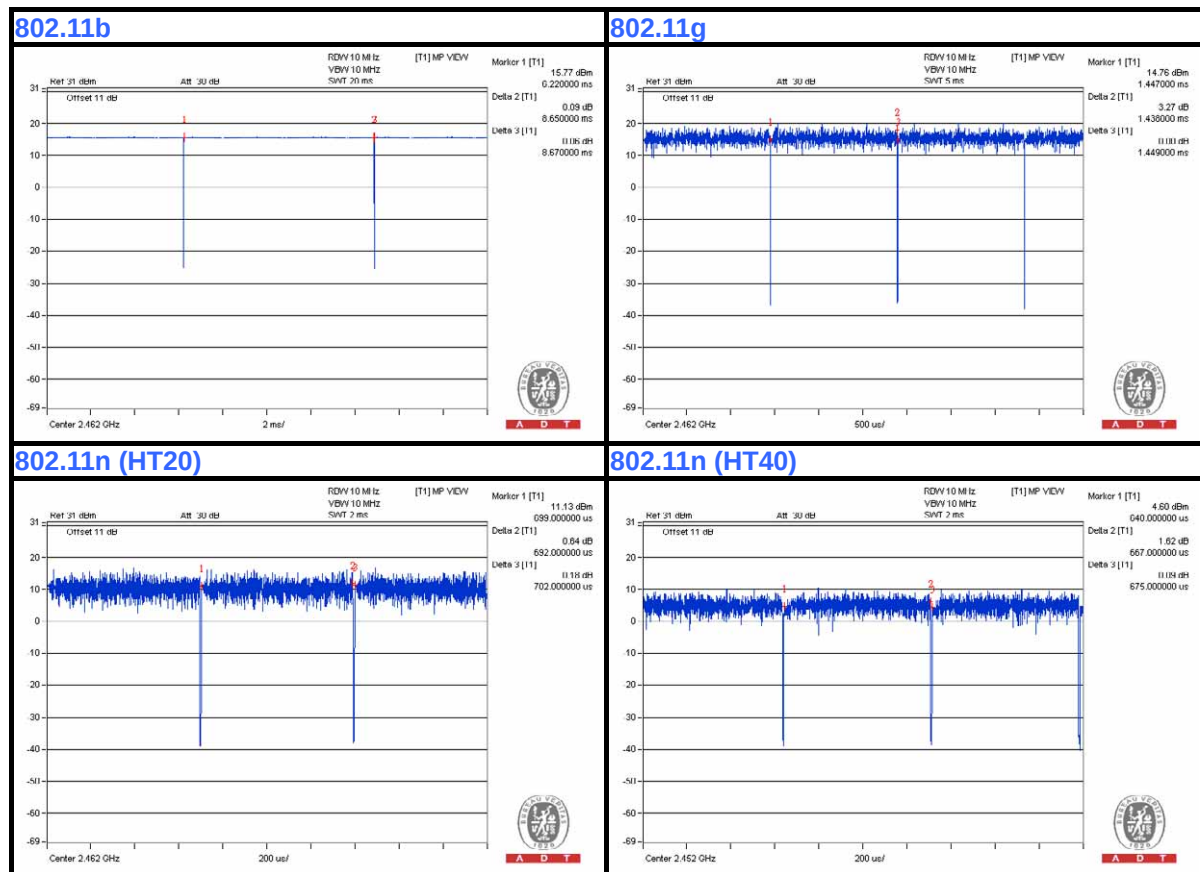
Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $8.65 \text{ ms} / 8.67 \text{ ms} = 0.998$

802.11g: Duty cycle = $1.438 \text{ ms} / 1.449 \text{ ms} = 0.992$

802.11n (HT20): Duty cycle = $0.692 \text{ ms} / 0.702 \text{ ms} = 0.986$

802.11n (HT40): Duty cycle = $0.667 \text{ ms} / 0.675 \text{ ms} = 0.988$





A D T

3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC	Provided by Lab
B	TEST TOOLS	Alpha	NA	NA	NA	Supplied by Client

NOTE:

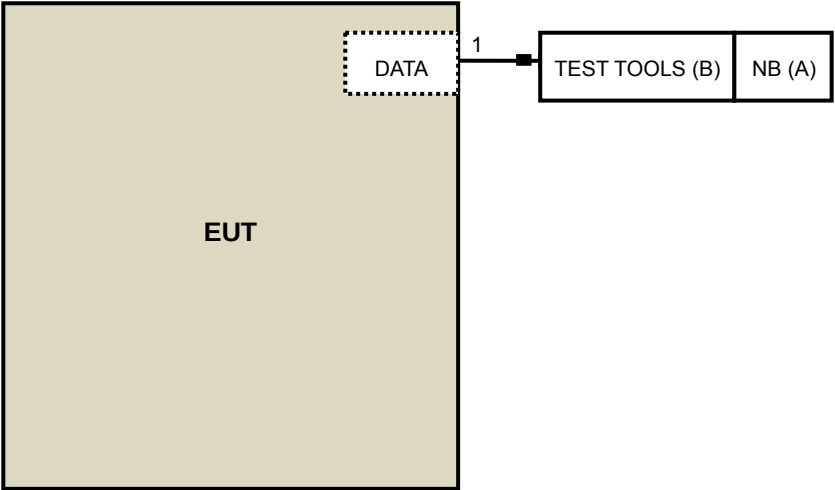
1. All power cords of the above support units are non-shielded (1.8 m).

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	USB	1	1	Yes	1	Supplied by Client

NOTE:

1. The core(s) is(are) originally attached to the cable(s).

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10, 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 2014
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Aug. 05, 2014

4.1.3 TEST PROCEDURES

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN.
- The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

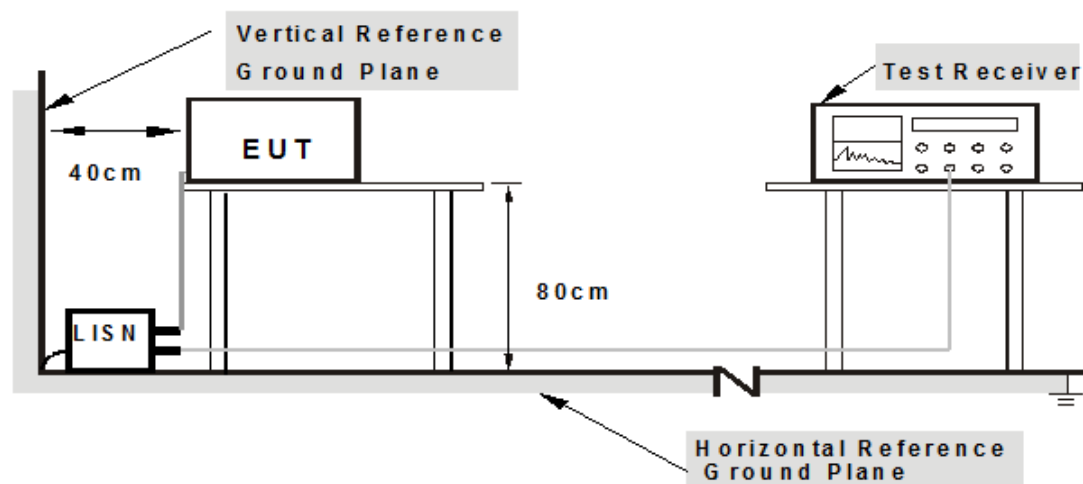
NOTE:

- The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



A D T

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support units A (NB) which is placed on a testing table.
2. The communication partner run test program "RT5x7x V1.0.8.0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

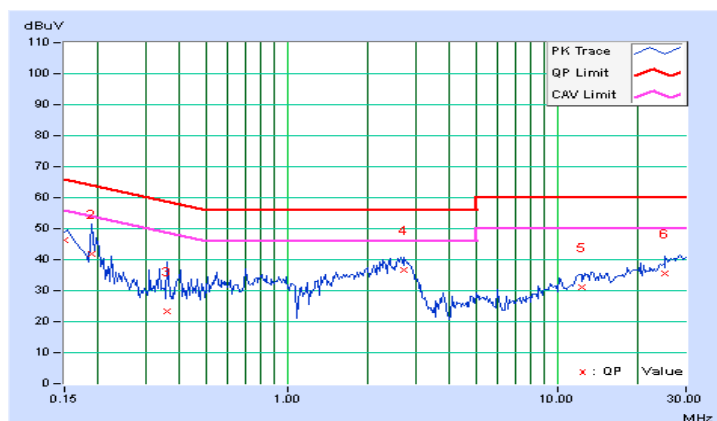
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	----------	----------------------	-----------------------------------

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	46.12	29.33	46.19	29.40	66.00	56.00	-19.81	-26.60
2	0.18906	0.07	41.85	23.06	41.92	23.13	64.08	54.08	-22.16	-30.95
3	0.36094	0.09	23.09	13.08	23.18	13.17	58.71	48.71	-35.53	-35.54
4	2.72266	0.20	36.35	30.51	36.55	30.71	56.00	46.00	-19.45	-15.29
5	12.27734	0.51	30.59	25.50	31.10	26.01	60.00	50.00	-28.90	-23.99
6	25.11719	0.85	34.54	26.83	35.39	27.68	60.00	50.00	-24.61	-22.32

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

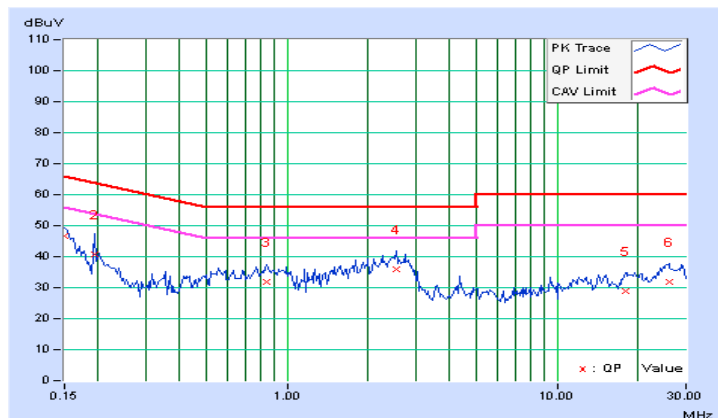


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	46.58	30.72	46.66	30.80	66.00	56.00	-19.34	-25.20
2	0.19297	0.07	40.72	21.71	40.79	21.78	63.91	53.91	-23.12	-32.13
3	0.83750	0.12	31.64	21.93	31.76	22.05	56.00	46.00	-24.24	-23.95
4	2.53125	0.20	35.81	29.74	36.01	29.94	56.00	46.00	-19.99	-16.06
5	17.86328	0.65	28.20	21.46	28.85	22.11	60.00	50.00	-31.15	-27.89
6	25.91016	0.87	31.07	23.86	31.94	24.73	60.00	50.00	-28.06	-25.27

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission Level – Limit value
4. Correction Factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Aug. 05 to 06, 2014

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

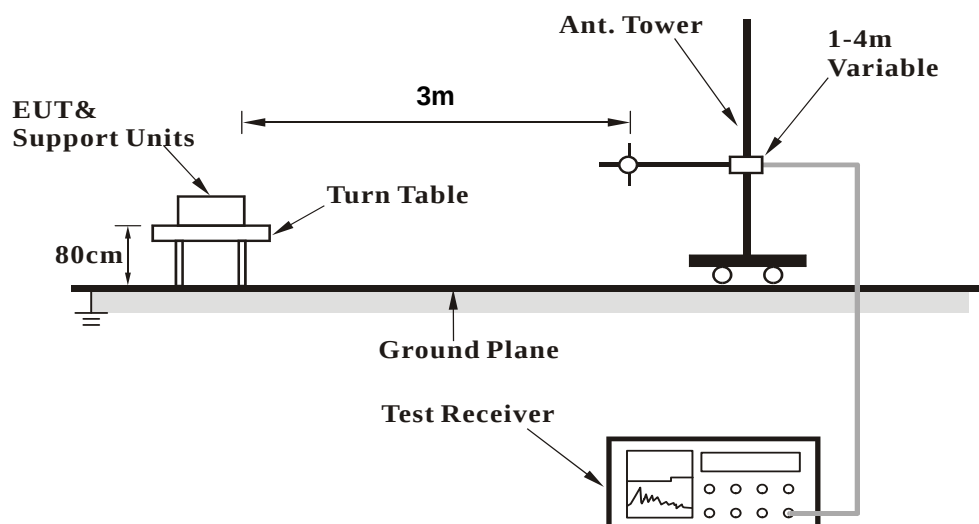
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

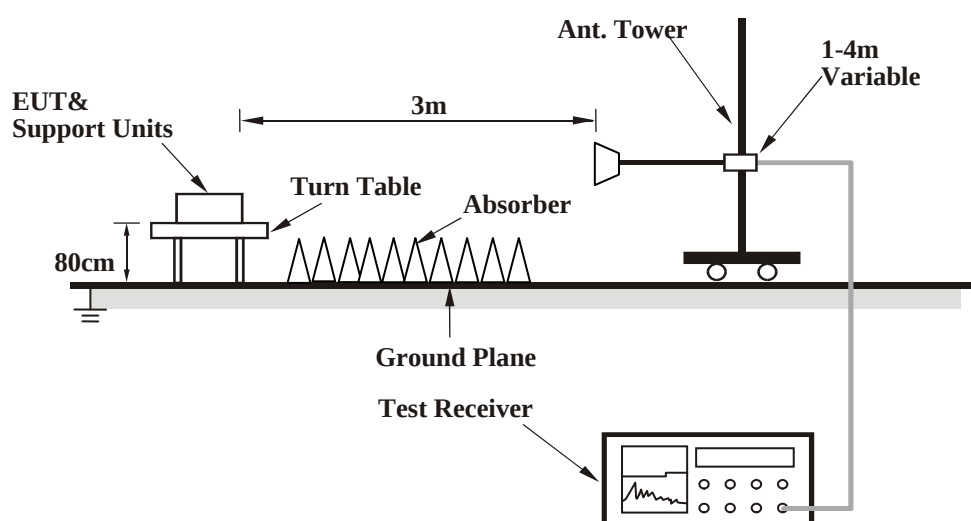
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11n (HT20)

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	162.76	30.2 QP	43.5	-13.3	2.00 H	142	43.54	-13.35
2	259.02	35.8 QP	46.0	-10.2	1.00 H	86	49.78	-13.97
3	284.29	37.1 QP	46.0	-8.9	1.00 H	97	49.98	-12.84
4	330.56	34.4 QP	46.0	-11.6	1.00 H	286	45.85	-11.46
5	400.94	33.6 QP	46.0	-12.4	1.00 H	188	43.28	-9.71
6	609.48	31.3 QP	46.0	-14.7	1.00 H	88	35.86	-4.55
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	37.52	31.8 QP	40.0	-8.2	1.50 V	360	45.79	-14.01
2	150.00	35.6 QP	43.5	-8.0	1.00 V	182	48.67	-13.12
3	281.30	35.3 QP	46.0	-10.7	1.50 V	130	48.23	-12.93
4	322.80	36.6 QP	46.0	-9.4	1.00 V	42	48.28	-11.65
5	391.86	31.4 QP	46.0	-14.6	1.00 V	153	41.23	-9.86
6	408.01	30.8 QP	46.0	-15.3	1.00 V	104	40.29	-9.54

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



A D T

ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2356.00	50.0 PK	74.0	-24.0	1.24 H	161	52.62	-2.62
2	2356.00	39.0 AV	54.0	-15.0	1.24 H	161	41.62	-2.62
3	*2412.00	105.8 PK			1.24 H	161	108.17	-2.37
4	*2412.00	103.0 AV			1.24 H	161	105.37	-2.37
5	4824.00	52.1 PK	74.0	-21.9	1.00 H	30	46.39	5.71
6	4824.00	48.8 AV	54.0	-5.2	1.00 H	30	43.09	5.71
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2356.00	49.6 PK	74.0	-24.4	1.05 V	239	52.22	-2.62
2	2356.00	38.3 AV	54.0	-15.7	1.05 V	239	40.92	-2.62
3	*2412.00	102.3 PK			1.05 V	239	104.67	-2.37
4	*2412.00	99.1 AV			1.05 V	239	101.47	-2.37
5	4824.00	56.4 PK	74.0	-17.6	1.02 V	46	50.69	5.71
6	4824.00	53.7 AV	54.0	-0.3	1.02 V	46	47.99	5.71

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.3 PK			1.21 H	162	108.55	-2.25
2	*2437.00	103.3 AV			1.21 H	162	105.55	-2.25
3	4874.00	51.6 PK	74.0	-22.4	1.00 H	49	45.70	5.90
4	4874.00	48.3 AV	54.0	-5.7	1.00 H	49	42.40	5.90
5	7311.00	54.6 PK	74.0	-19.4	1.00 H	359	41.43	13.17
6	7311.00	41.1 AV	54.0	-12.9	1.00 H	359	27.93	13.17
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.2 PK			1.07 V	239	105.45	-2.25
2	*2437.00	100.7 AV			1.07 V	239	102.95	-2.25
3	4874.00	55.6 PK	74.0	-18.4	1.01 V	62	49.70	5.90
4	4874.00	53.8 AV	54.0	-0.2	1.01 V	62	47.90	5.90
5	7311.00	54.4 PK	74.0	-19.6	1.00 V	122	41.23	13.17
6	7311.00	41.0 AV	54.0	-13.0	1.00 V	122	27.83	13.17

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.0 PK			1.19 H	154	108.14	-2.14
2	*2462.00	103.2 AV			1.19 H	154	105.34	-2.14
3	2483.50	49.9 PK	74.0	-24.1	1.19 H	154	51.93	-2.03
4	2483.50	38.7 AV	54.0	-15.3	1.19 H	154	40.73	-2.03
5	4924.00	51.8 PK	74.0	-22.2	1.00 H	37	45.69	6.11
6	4924.00	48.6 AV	54.0	-5.4	1.00 H	37	42.49	6.11
7	7386.00	54.4 PK	74.0	-19.6	1.00 H	352	41.22	13.18
8	7386.00	41.0 AV	54.0	-13.0	1.00 H	352	27.82	13.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	102.9 PK			1.08 V	233	105.04	-2.14
2	*2462.00	100.4 AV			1.08 V	233	102.54	-2.14
3	2483.50	49.2 PK	74.0	-24.8	1.08 V	233	51.23	-2.03
4	2483.50	38.0 AV	54.0	-16.0	1.08 V	233	40.03	-2.03
5	4924.00	55.7 PK	74.0	-18.3	1.00 V	61	49.59	6.11
6	4924.00	53.8 AV	54.0	-0.2	1.00 V	61	47.69	6.11
7	7386.00	54.5 PK	74.0	-19.5	1.00 V	130	41.32	13.18
8	7386.00	41.0 AV	54.0	-13.0	1.00 V	130	27.82	13.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.3 PK	74.0	-0.7	1.25 H	16	75.77	-2.47
2	2390.00	53.5 AV	54.0	-0.5	1.25 H	16	55.97	-2.47
3	*2412.00	108.2 PK			1.25 H	16	110.57	-2.37
4	*2412.00	97.5 AV			1.25 H	16	99.87	-2.37
5	4824.00	63.0 PK	74.0	-11.0	1.04 H	53	57.29	5.71
6	4824.00	47.7 AV	54.0	-6.3	1.04 H	53	41.99	5.71
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.3 PK	74.0	-3.7	1.13 V	236	72.77	-2.47
2	2390.00	50.3 AV	54.0	-3.7	1.13 V	236	52.77	-2.47
3	*2412.00	105.0 PK			1.13 V	236	107.37	-2.37
4	*2412.00	94.1 AV			1.13 V	236	96.47	-2.37
5	4824.00	65.3 PK	74.0	-8.7	1.00 V	69	59.59	5.71
6	4824.00	51.3 AV	54.0	-2.7	1.00 V	69	45.59	5.71

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2384.80	67.8 PK	74.0	-6.2	1.26 H	13	70.29	-2.49
2	2384.80	52.4 AV	54.0	-1.6	1.26 H	13	54.89	-2.49
3	*2437.00	112.1 PK			1.22 H	360	114.35	-2.25
4	*2437.00	101.6 AV			1.22 H	360	103.85	-2.25
5	2483.50	68.4 PK	74.0	-5.6	1.22 H	15	70.43	-2.03
6	2483.50	52.7 AV	54.0	-1.3	1.22 H	15	54.73	-2.03
7	4874.00	62.7 PK	74.0	-11.3	1.04 H	42	56.80	5.90
8	4874.00	47.5 AV	54.0	-6.5	1.04 H	42	41.60	5.90
9	7311.00	54.6 PK	74.0	-19.4	1.05 H	344	41.43	13.17
10	7311.00	40.6 AV	54.0	-13.4	1.05 H	344	27.43	13.17
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2384.80	64.4 PK	74.0	-9.6	1.11 V	244	66.89	-2.49
2	2384.80	49.0 AV	54.0	-5.0	1.11 V	244	51.49	-2.49
3	*2437.00	108.5 PK			1.11 V	244	110.75	-2.25
4	*2437.00	98.3 AV			1.11 V	244	100.55	-2.25
5	2483.50	65.5 PK	74.0	-8.5	1.11 V	244	67.53	-2.03
6	2483.50	49.6 AV	54.0	-4.4	1.11 V	244	51.63	-2.03
7	4874.00	64.6 PK	74.0	-9.4	1.01 V	69	58.70	5.90
8	4874.00	50.8 AV	54.0	-3.2	1.01 V	69	44.90	5.90
9	7311.00	54.7 PK	74.0	-19.3	1.05 V	125	41.53	13.17
10	7311.00	41.0 AV	54.0	-13.0	1.05 V	125	27.83	13.17

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.6 PK			1.00 H	360	109.74	-2.14
2	*2462.00	96.8 AV			1.00 H	360	98.94	-2.14
3	2483.50	71.8 PK	74.0	-2.2	1.00 H	360	73.83	-2.03
4	2483.50	52.7 AV	54.0	-1.3	1.00 H	360	54.73	-2.03
5	4924.00	63.2 PK	74.0	-10.8	1.01 H	39	57.09	6.11
6	4924.00	47.8 AV	54.0	-6.2	1.01 H	39	41.69	6.11
7	7386.00	54.3 PK	74.0	-19.7	1.09 H	332	41.12	13.18
8	7386.00	40.6 AV	54.0	-13.4	1.09 H	332	27.42	13.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.1 PK			1.55 V	79	108.24	-2.14
2	*2462.00	95.1 AV			1.55 V	79	97.24	-2.14
3	2483.50	71.1 PK	74.0	-2.9	1.55 V	79	73.13	-2.03
4	2483.50	52.4 AV	54.0	-1.6	1.55 V	79	54.43	-2.03
5	4924.00	64.3 PK	74.0	-9.7	1.06 V	78	58.19	6.11
6	4924.00	50.7 AV	54.0	-3.3	1.06 V	78	44.59	6.11
7	7386.00	54.6 PK	74.0	-19.4	1.09 V	139	41.42	13.18
8	7386.00	40.6 AV	54.0	-13.4	1.09 V	139	27.42	13.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.6 PK	74.0	-1.4	1.00 H	360	75.07	-2.47
2	2390.00	51.5 AV	54.0	-2.5	1.00 H	360	53.97	-2.47
3	*2412.00	108.1 PK			1.00 H	360	110.47	-2.37
4	*2412.00	97.1 AV			1.00 H	360	99.47	-2.37
5	4824.00	62.4 PK	74.0	-11.6	1.04 H	29	56.69	5.71
6	4824.00	47.6 AV	54.0	-6.4	1.04 H	29	41.89	5.71
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.1 PK	74.0	-4.9	1.06 V	233	71.57	-2.47
2	2390.00	48.1 AV	54.0	-5.9	1.06 V	233	50.57	-2.47
3	*2412.00	104.8 PK			1.06 V	233	107.17	-2.37
4	*2412.00	93.8 AV			1.06 V	233	96.17	-2.37
5	4824.00	62.2 PK	74.0	-11.8	1.00 V	74	56.49	5.71
6	4824.00	47.1 AV	54.0	-6.9	1.00 V	74	41.39	5.71

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2385.00	63.8 PK	74.0	-10.2	1.00 H	9	66.29	-2.49
2	2385.00	49.8 AV	54.0	-4.2	1.00 H	9	52.29	-2.49
3	*2437.00	112.2 PK			1.00 H	9	114.45	-2.25
4	*2437.00	101.4 AV			1.00 H	9	103.65	-2.25
5	2483.50	73.2 PK	74.0	-0.8	1.00 H	9	75.23	-2.03
6	2483.50	52.0 AV	54.0	-2.0	1.00 H	9	54.03	-2.03
7	4874.00	62.6 PK	74.0	-11.4	1.03 H	28	56.70	5.90
8	4874.00	47.6 AV	54.0	-6.4	1.03 H	28	41.70	5.90
9	7311.00	54.8 PK	74.0	-19.2	1.05 H	335	41.63	13.17
10	7311.00	41.0 AV	54.0	-13.0	1.05 H	335	27.83	13.17

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2385.00	60.1 PK	74.0	-13.9	1.06 V	232	62.59	-2.49
2	2385.00	46.4 AV	54.0	-7.6	1.06 V	232	48.89	-2.49
3	*2437.00	108.8 PK			1.06 V	232	111.05	-2.25
4	*2437.00	98.2 AV			1.06 V	232	100.45	-2.25
5	2483.50	70.3 PK	74.0	-3.7	1.06 V	232	72.33	-2.03
6	2483.50	49.2 AV	54.0	-4.8	1.06 V	232	51.23	-2.03
7	4874.00	62.3 PK	74.0	-11.7	1.02 V	69	56.40	5.90
8	4874.00	47.1 AV	54.0	-6.9	1.02 V	69	41.20	5.90
9	7311.00	54.9 PK	74.0	-19.1	1.10 V	123	41.73	13.17
10	7311.00	40.7 AV	54.0	-13.3	1.10 V	123	27.53	13.17

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.9 PK			1.00 H	360	109.04	-2.14
2	*2462.00	96.3 AV			1.00 H	360	98.44	-2.14
3	2483.50	73.1 PK	74.0	-0.9	1.00 H	360	75.13	-2.03
4	2483.50	48.3 AV	54.0	-5.7	1.00 H	360	50.33	-2.03
5	4924.00	62.8 PK	74.0	-11.2	1.06 H	52	56.69	6.11
6	4924.00	47.9 AV	54.0	-6.1	1.06 H	52	41.79	6.11
7	7386.00	54.7 PK	74.0	-19.3	1.08 H	331	41.52	13.18
8	7386.00	40.8 AV	54.0	-13.2	1.08 H	331	27.62	13.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.5 PK			1.00 V	73	105.64	-2.14
2	*2462.00	93.1 AV			1.00 V	73	95.24	-2.14
3	2483.50	66.8 PK	74.0	-7.2	1.00 V	73	68.83	-2.03
4	2483.50	44.9 AV	54.0	-9.1	1.00 V	73	46.93	-2.03
5	4924.00	62.1 PK	74.0	-11.9	1.04 V	64	55.99	6.11
6	4924.00	46.8 AV	54.0	-7.2	1.04 V	64	40.69	6.11
7	7386.00	54.7 PK	74.0	-19.3	1.13 V	138	41.52	13.18
8	7386.00	40.8 AV	54.0	-13.2	1.13 V	138	27.62	13.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.4 PK	74.0	-1.6	1.00 H	360	74.87	-2.47
2	2390.00	48.3 AV	54.0	-5.7	1.00 H	360	50.77	-2.47
3	*2422.00	103.0 PK			1.00 H	360	105.32	-2.32
4	*2422.00	91.6 AV			1.00 H	360	93.92	-2.32
5	4844.00	62.2 PK	74.0	-11.8	1.08 H	57	56.42	5.78
6	4844.00	47.2 AV	54.0	-6.8	1.08 H	57	41.42	5.78
7	7266.00	54.4 PK	74.0	-19.6	1.07 H	348	41.20	13.20
8	7266.00	40.7 AV	54.0	-13.3	1.07 H	348	27.50	13.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.0 PK	74.0	-5.0	1.05 V	235	71.47	-2.47
2	2390.00	44.8 AV	54.0	-9.2	1.05 V	235	47.27	-2.47
3	*2422.00	100.5 PK			1.05 V	235	102.82	-2.32
4	*2422.00	89.0 AV			1.05 V	235	91.32	-2.32
5	4844.00	62.0 PK	74.0	-12.0	1.08 V	71	56.22	5.78
6	4844.00	46.7 AV	54.0	-7.3	1.08 V	71	40.92	5.78
7	7266.00	54.9 PK	74.0	-19.1	1.18 V	151	41.70	13.20
8	7266.00	41.3 AV	54.0	-12.7	1.18 V	151	28.10	13.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.8 PK	74.0	-8.2	1.00 H	360	68.27	-2.47
2	2390.00	48.3 AV	54.0	-5.7	1.00 H	360	50.77	-2.47
3	*2437.00	106.2 PK			1.00 H	360	108.45	-2.25
4	*2437.00	94.7 AV			1.00 H	360	96.95	-2.25
5	2483.50	72.7 PK	74.0	-1.3	1.00 H	360	74.73	-2.03
6	2483.50	52.2 AV	54.0	-1.8	1.00 H	360	54.23	-2.03
7	4874.00	62.7 PK	74.0	-11.3	1.00 H	41	56.80	5.90
8	4874.00	47.3 AV	54.0	-6.7	1.00 H	41	41.40	5.90
9	7311.00	55.2 PK	74.0	-18.8	1.09 H	330	42.03	13.17
10	7311.00	41.1 AV	54.0	-12.9	1.09 H	330	27.93	13.17

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.4 PK	74.0	-11.6	1.09 V	243	64.87	-2.47
2	2390.00	44.9 AV	54.0	-9.1	1.09 V	243	47.37	-2.47
3	*2437.00	103.6 PK			1.09 V	243	105.85	-2.25
4	*2437.00	92.0 AV			1.09 V	243	94.25	-2.25
5	2483.50	69.3 PK	74.0	-4.7	1.09 V	243	71.33	-2.03
6	2483.50	48.8 AV	54.0	-5.2	1.09 V	243	50.83	-2.03
7	4874.00	61.9 PK	74.0	-12.1	1.01 V	66	56.00	5.90
8	4874.00	46.7 AV	54.0	-7.3	1.01 V	66	40.80	5.90
9	7311.00	55.2 PK	74.0	-18.8	1.17 V	143	42.03	13.17
10	7311.00	41.3 AV	54.0	-12.7	1.17 V	143	28.13	13.17

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



A D T

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	102.9 PK			1.00 H	360	105.08	-2.18
2	*2452.00	90.7 AV			1.00 H	360	92.88	-2.18
3	2483.50	73.3 PK	74.0	-0.7	1.00 H	360	75.33	-2.03
4	2483.50	51.9 AV	54.0	-2.1	1.00 H	360	53.93	-2.03
5	4904.00	63.0 PK	74.0	-11.0	1.09 H	39	56.98	6.02
6	4904.00	47.6 AV	54.0	-6.4	1.09 H	39	41.58	6.02
7	7356.00	54.8 PK	74.0	-19.2	1.06 H	346	41.62	13.18
8	7356.00	40.8 AV	54.0	-13.2	1.06 H	346	27.62	13.18
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	99.9 PK			1.13 V	239	102.08	-2.18
2	*2452.00	87.5 AV			1.13 V	239	89.68	-2.18
3	2483.50	70.0 PK	74.0	-4.0	1.13 V	239	72.03	-2.03
4	2483.50	48.6 AV	54.0	-5.4	1.13 V	239	50.63	-2.03
5	4904.00	61.7 PK	74.0	-12.3	1.06 V	53	55.68	6.02
6	4904.00	46.4 AV	54.0	-7.6	1.06 V	53	40.38	6.02
7	7356.00	54.5 PK	74.0	-19.5	1.09 V	125	41.32	13.18
8	7356.00	40.8 AV	54.0	-13.2	1.09 V	125	27.62	13.18

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Aug. 12, 2014

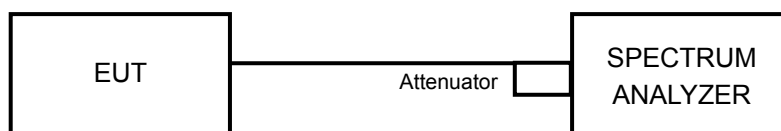
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.18	0.5	PASS
6	2437	10.20	0.5	PASS
11	2462	10.20	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.36	0.5	PASS
6	2437	15.52	0.5	PASS
11	2462	16.39	0.5	PASS

802.11n (HT20)

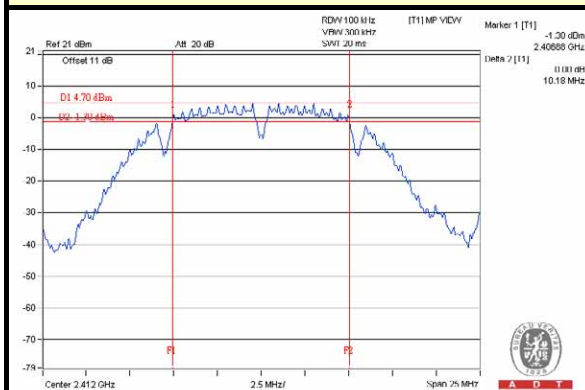
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.18	16.58	0.5	PASS
6	2437	15.86	15.89	0.5	PASS
11	2462	16.78	17.06	0.5	PASS

802.11n (HT40)

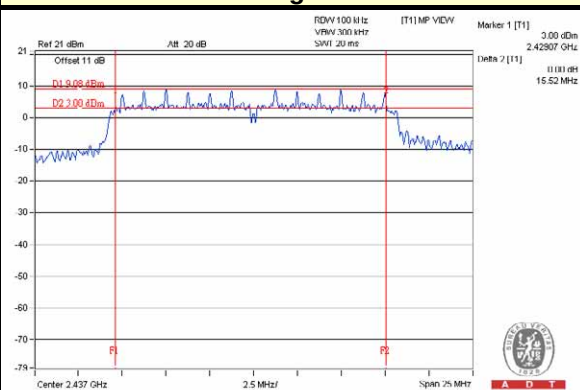
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	35.34	35.33	0.5	PASS
6	2437	35.35	35.33	0.5	PASS
9	2452	35.34	35.35	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

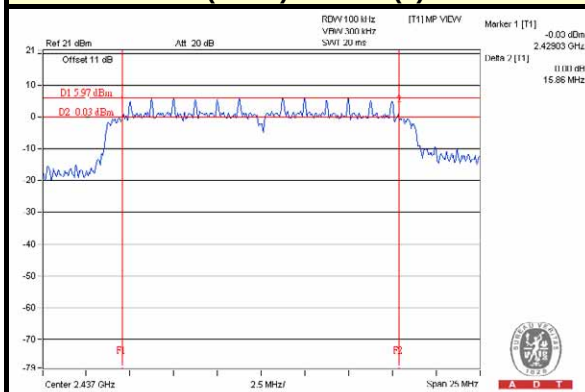
802.11b / CH11



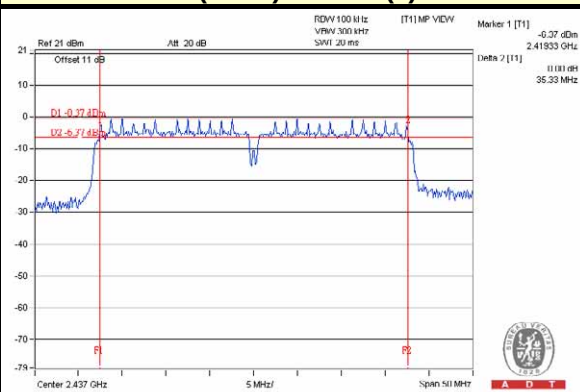
802.11g / CH6



802.11n (HT20) / Chain (0) : CH6



802.11n (HT40) / Chain (1) : CH6



4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $NANT \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = $5 \log(NANT/NSS)$ dB or 3 dB, whichever is less for 20-MHz channel widths with $NANT \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(NANT/NSS)$ dB.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Aug. 12, 2014

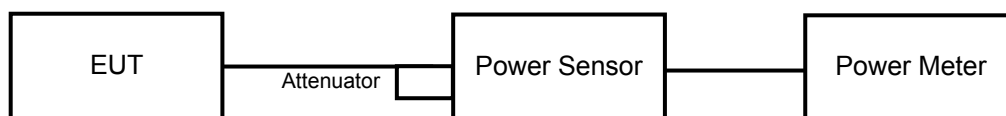
4.4.3 TEST PROCEDURES

The peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the peak power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	51.286	17.10	30	PASS
6	2437	48.195	16.83	30	PASS
11	2462	41.495	16.18	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	185.353	22.68	30	PASS
6	2437	195.434	22.91	30	PASS
11	2462	137.404	21.38	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	21.05	21.72	275.944	24.41	30	PASS
6	2437	21.70	23.43	368.204	25.66	30	PASS
11	2462	19.22	20.34	191.703	22.83	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	19.42	20.09	189.592	22.78	30	PASS
6	2437	21.10	22.52	307.474	24.88	30	PASS
9	2452	18.53	19.28	156.008	21.93	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	29.444	14.69
6	2437	27.040	14.32
11	2462	22.803	13.58

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	26.853	14.29
6	2437	73.790	18.68
11	2462	21.281	13.28

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
1	2412	13.10	13.36	42.094	16.24
6	2437	17.08	17.79	111.167	20.46
11	2462	10.12	10.65	21.894	13.40

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1		
3	2422	10.94	11.14	25.419	14.05
6	2437	13.83	14.10	49.859	16.98
9	2452	9.13	9.60	17.305	12.38

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Aug. 12, 2014

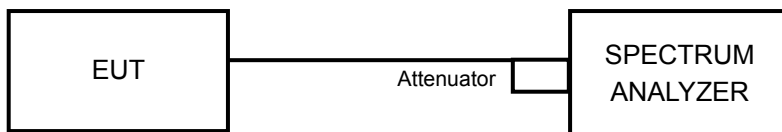
4.5.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

**A D T**

4.5.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-11.71	8	PASS
6	2437	-13.48	8	PASS
11	2462	-12.67	8	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-11.77	8	PASS
6	2437	-8.16	8	PASS
11	2462	-13.54	8	PASS

802.11n (HT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-14.27	3.01	-11.26	8	PASS
	6	2437	-10.38	3.01	-7.37	8	PASS
	11	2462	-16.08	3.01	-13.07	8	PASS
1	1	2412	-13.17	3.01	-10.16	8	PASS
	6	2437	-9.15	3.01	-6.14	8	PASS
	11	2462	-17.20	3.01	-14.19	8	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.5\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

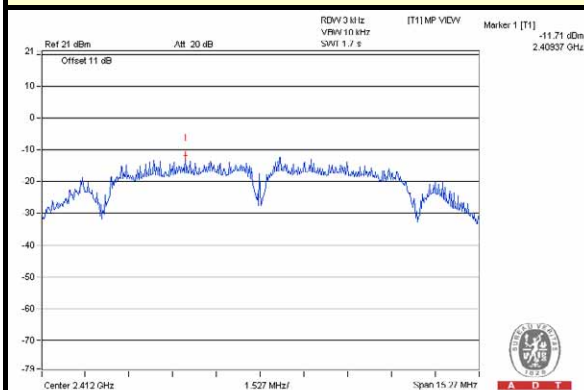
802.11n (HT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	3	2422	-19.34	3.01	-16.33	8	PASS
	6	2437	-15.73	3.01	-12.72	8	PASS
	9	2452	-20.17	3.01	-17.16	8	PASS
1	3	2422	-18.56	3.01	-15.55	8	PASS
	6	2437	-15.54	3.01	-12.53	8	PASS
	9	2452	-20.51	3.01	-17.50	8	PASS

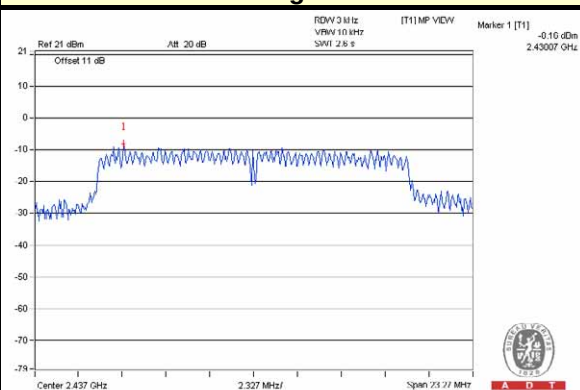
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.5\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

SPECTRUM PLOT OF WORST VALUE

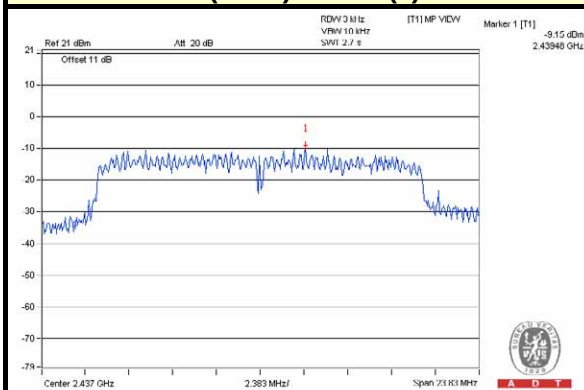
802.11b / CH1



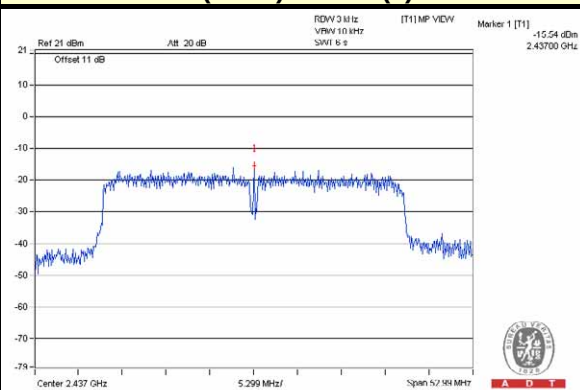
802.11g / CH6



802.11n (HT20) / Chain(1) : CH6



802.11n (HT40) / Chain(1) : CH6



4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Aug. 12, 2014

4.6.3 TEST PROCEDURE

Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

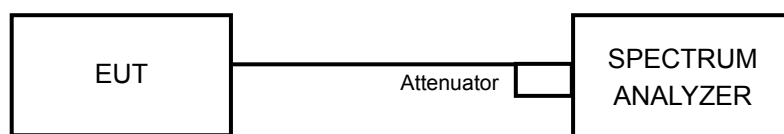
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

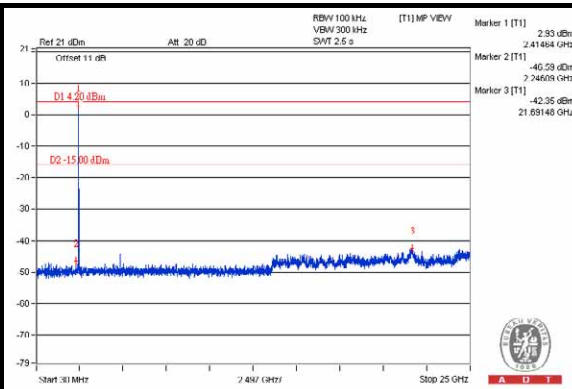
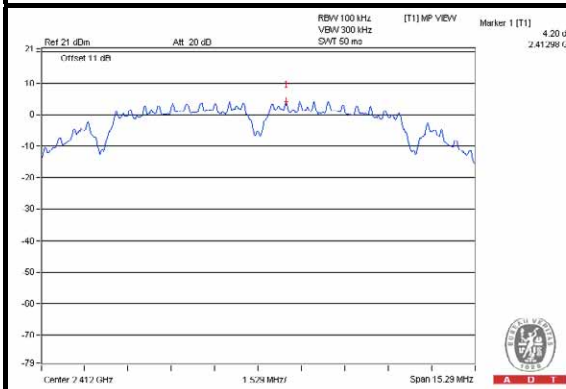
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



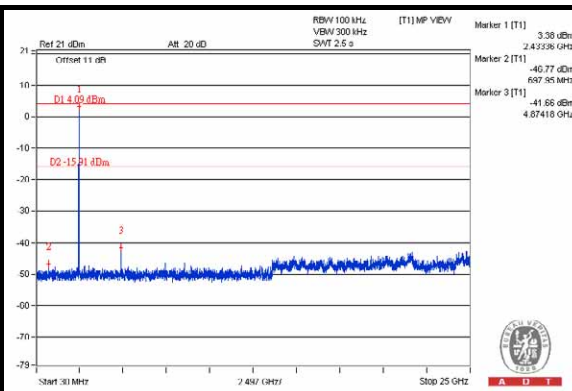
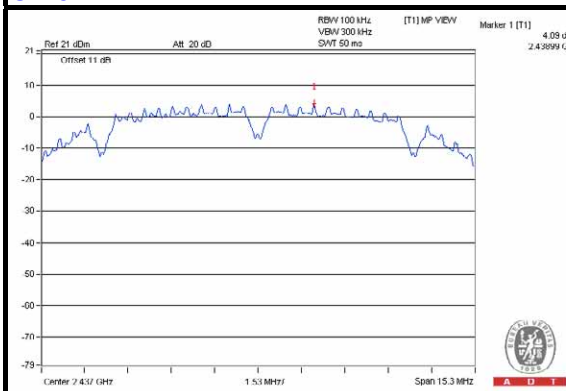
A D T

802.11b

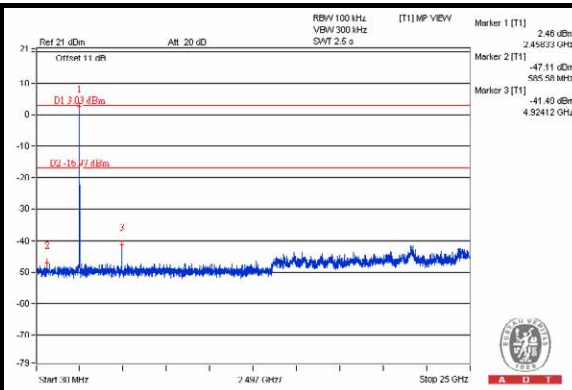
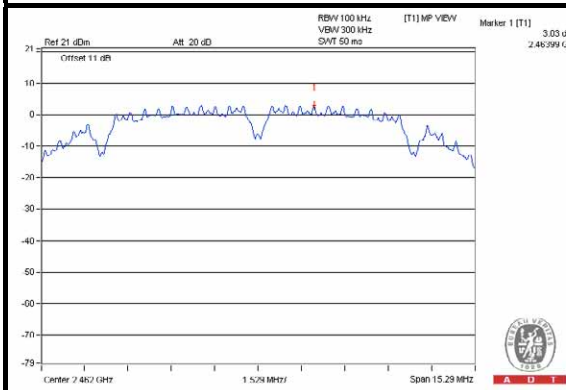
CH 1



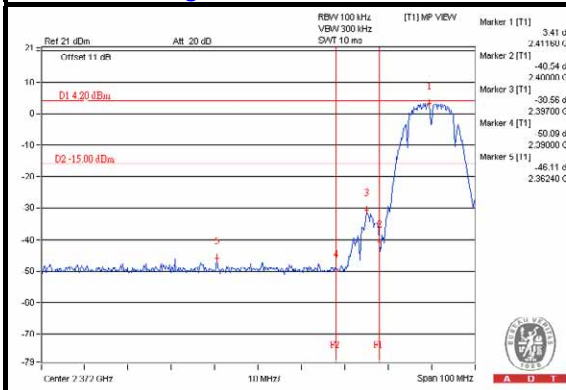
CH 6



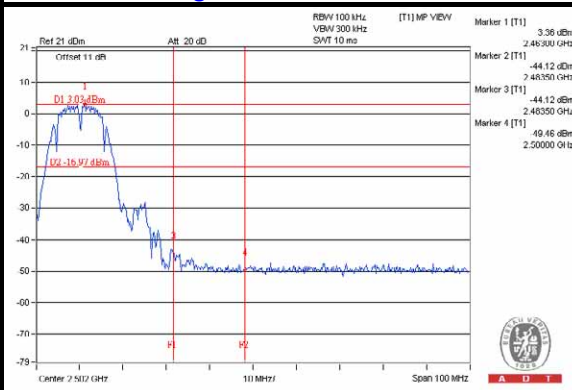
CH 11



CH 1 Band edge



CH 11 Band edge

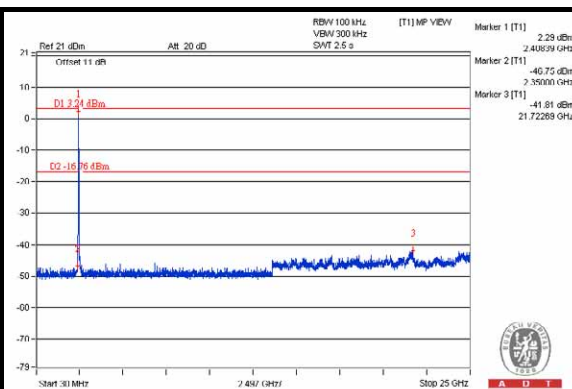
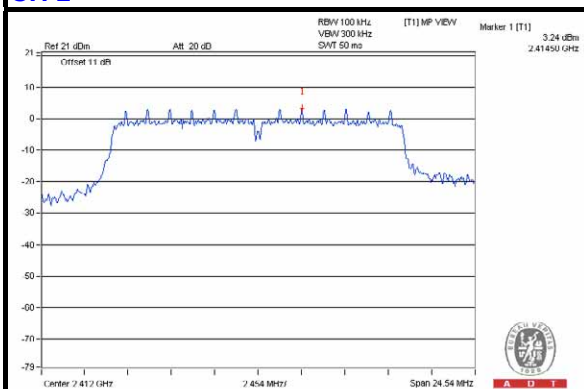




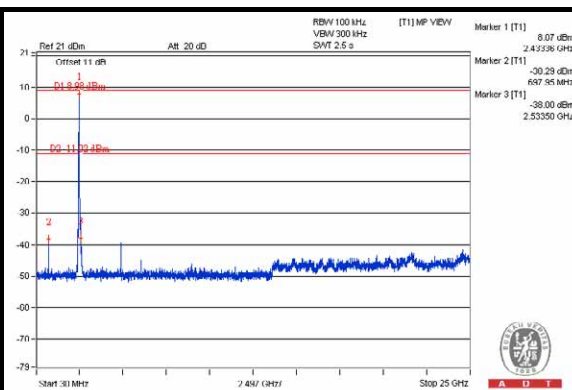
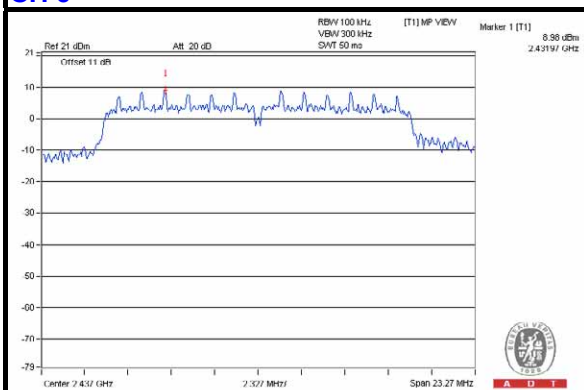
A D T

802.11g

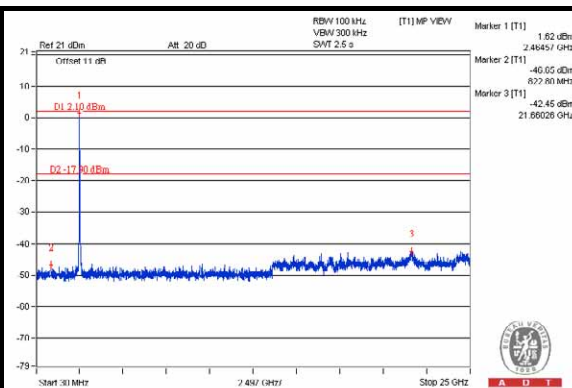
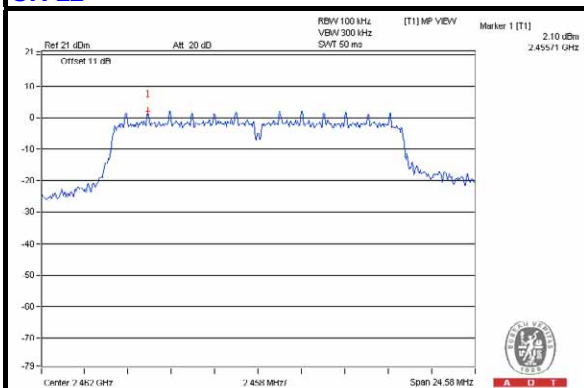
CH 1



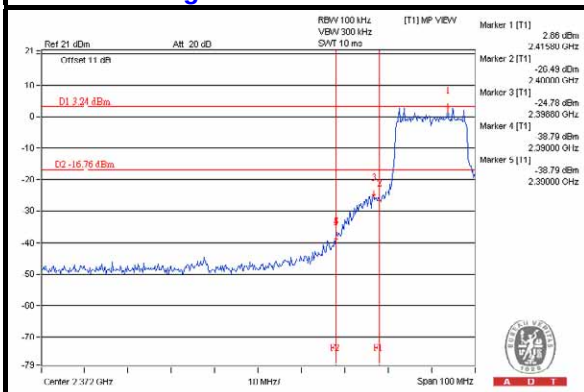
CH 6



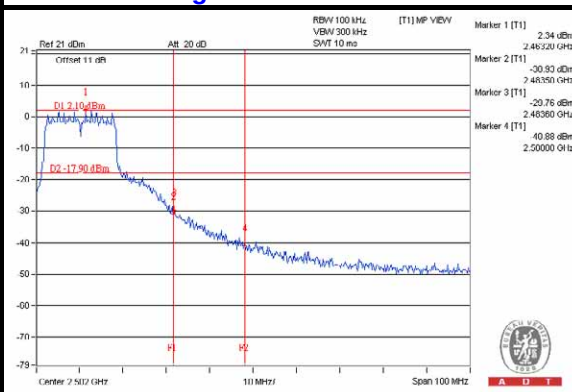
CH 11



CH 1 Band edge



CH 11 Band edge



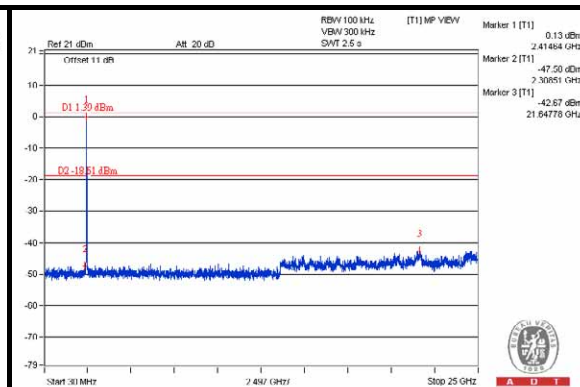
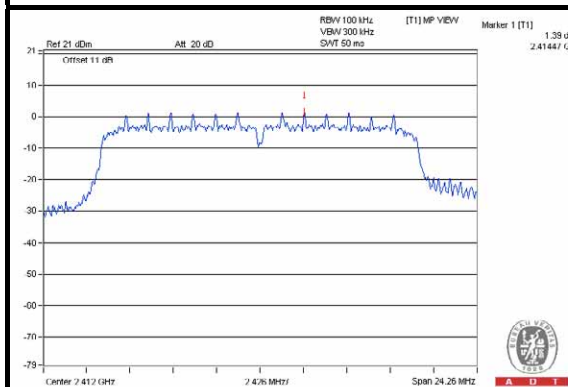


A D T

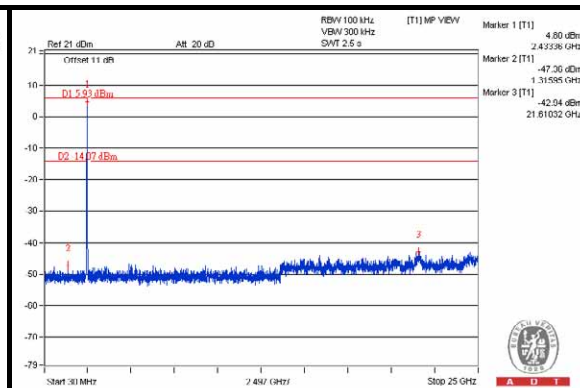
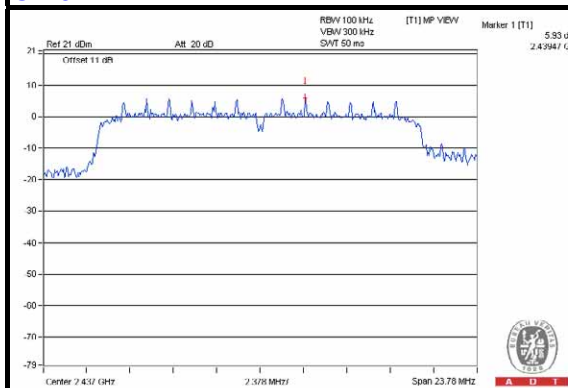
802.11n (HT20)

Chain (0)

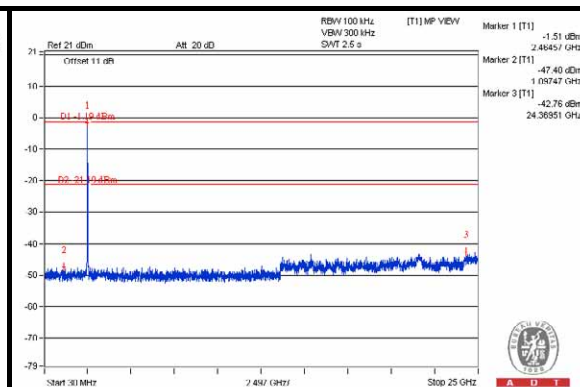
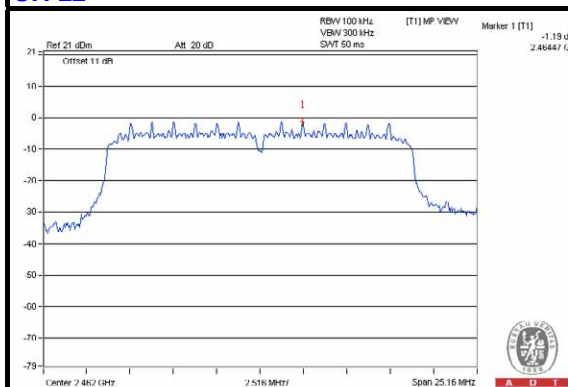
CH 1



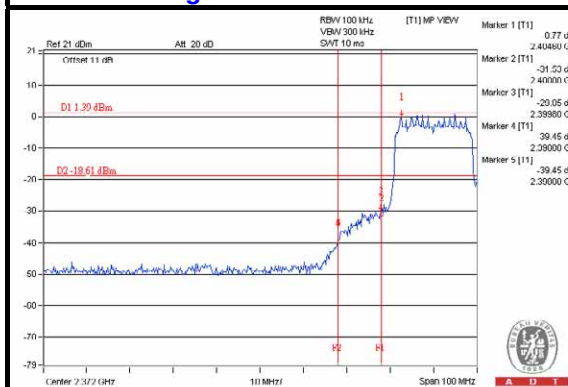
CH 6



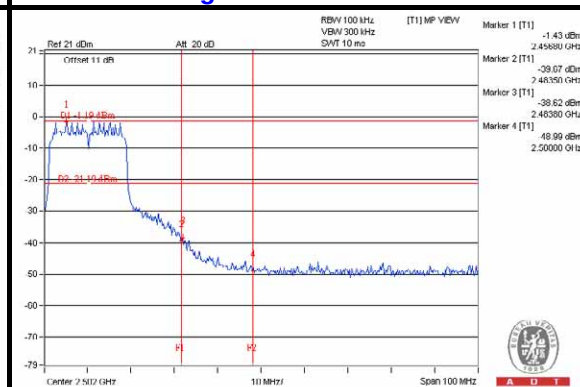
CH 11



CH 1 Band edge



CH 11 Band edge

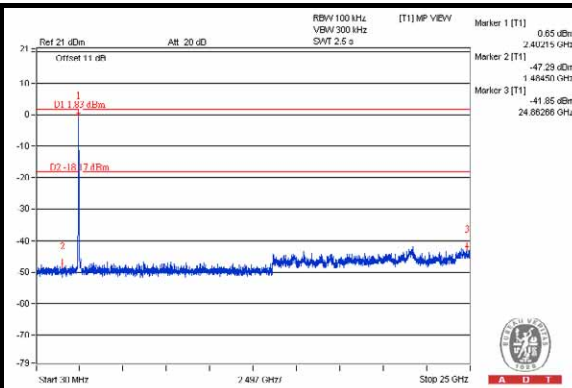
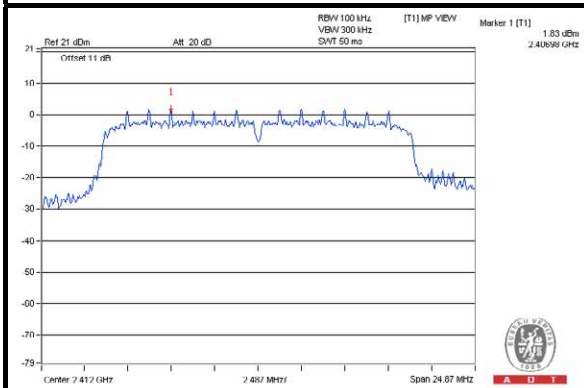




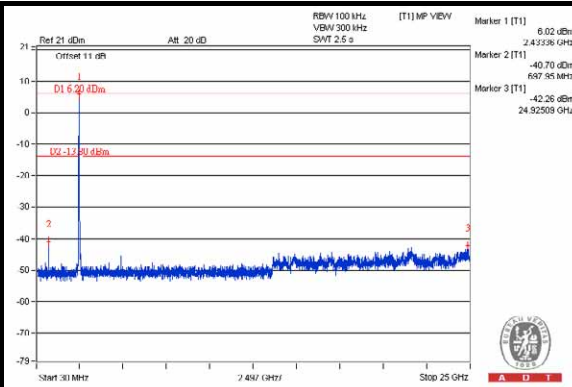
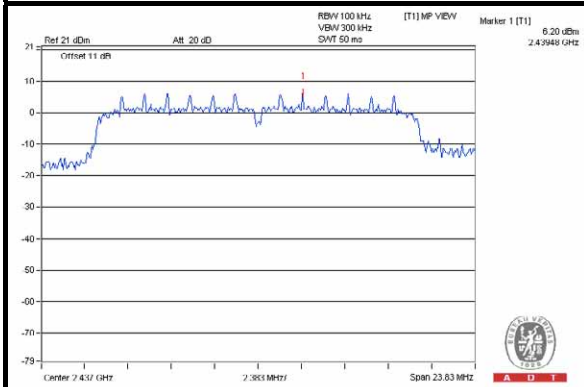
A D T

Chain (1)

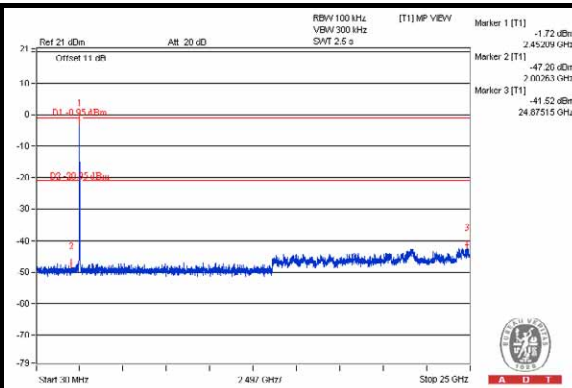
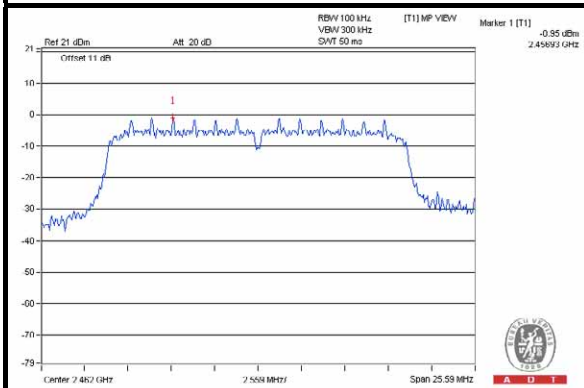
CH 1



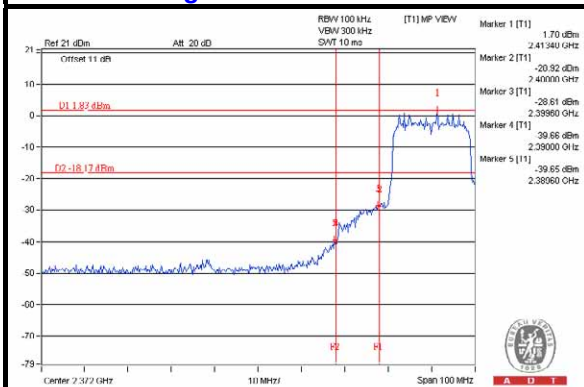
CH 6



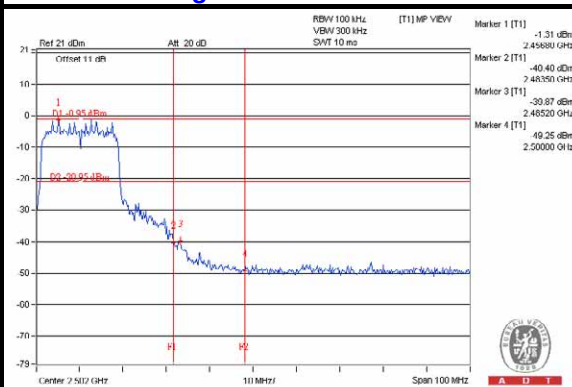
CH 11



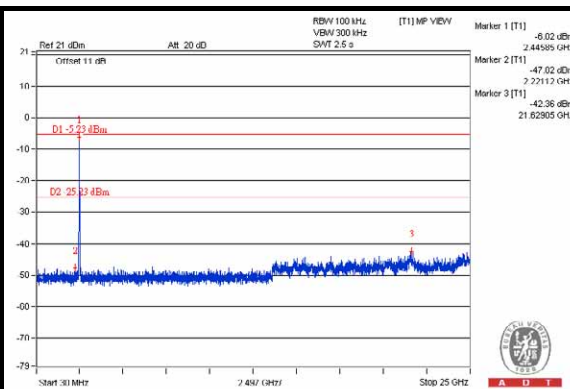
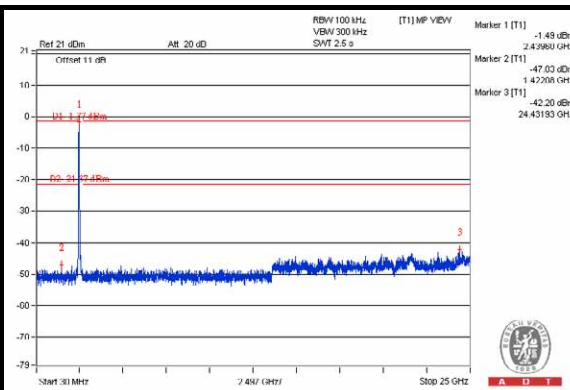
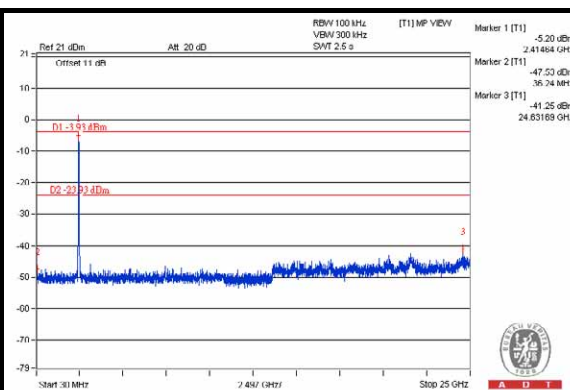
CH 1 Band edge



CH 11 Band edge



CH 3



Ref 21 dBm Att 20 dB

Offset 11 dB

D1 -5.23 dBm

D2 25.23 dBm

Marker 1 [T1] -5.70 dBm 2.44320 GHz

Marker 2 [T1] -40.02 dBm 2.48350 GHz

Marker 3 [T1] -39.88 dBm 2.48800 GHz

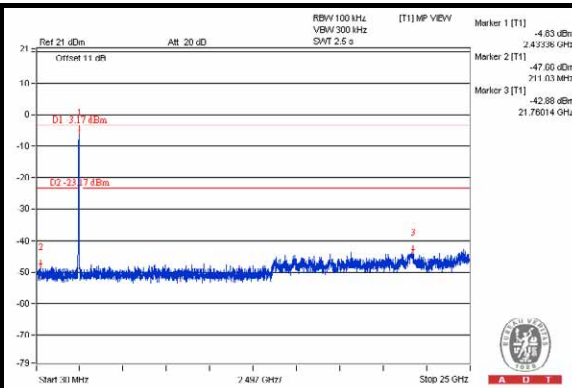
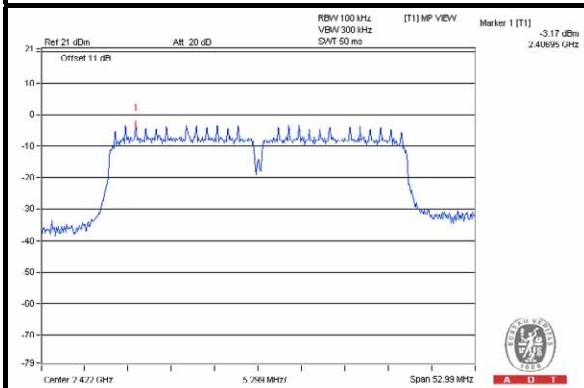
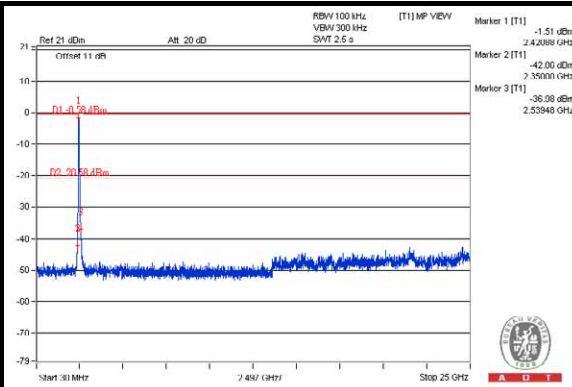
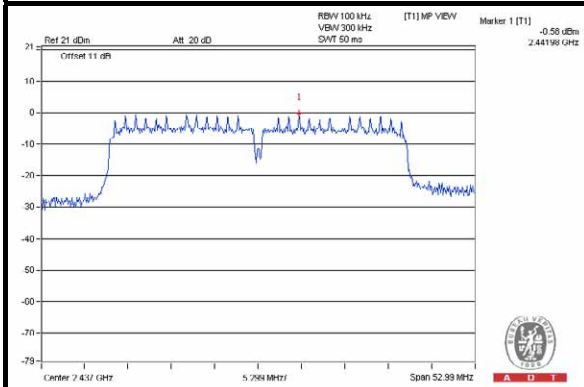
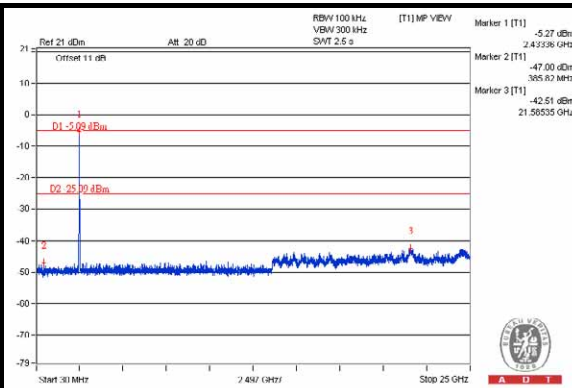
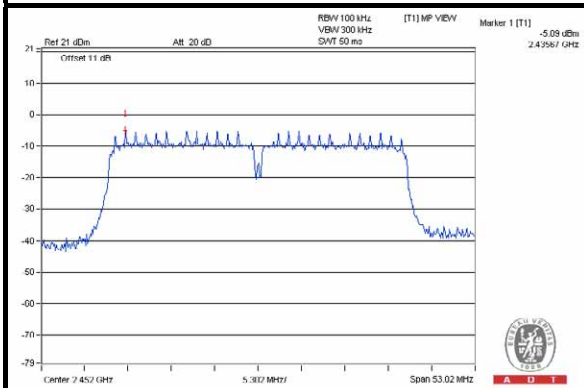
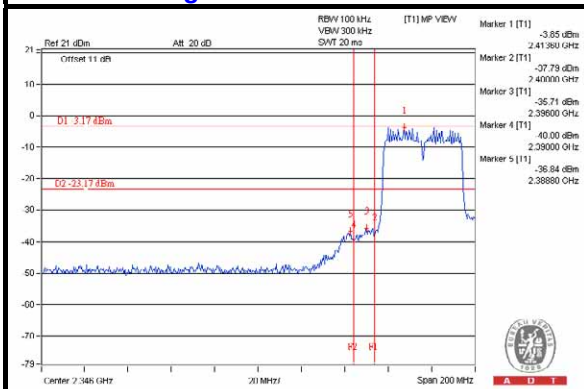
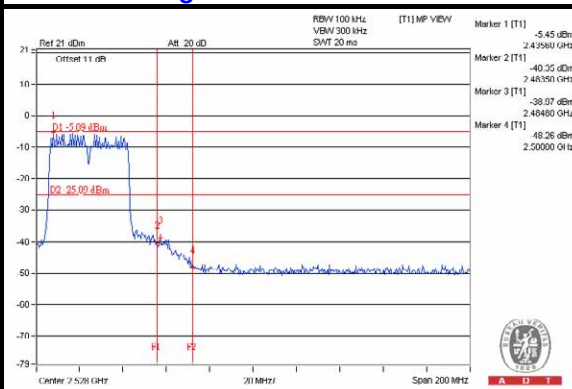
Marker 4 [T1] -48.54 dBm 2.50000 GHz

Center 2.528 GHz Span 200 MHz

21 MHz



A D T

Chain (1)**CH 3****CH 6****CH 9****CH 3 Band edge****CH 9 Band edge**



A D T

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



A D T

6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.



A D T

7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

--- END ---